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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/907,902	07/19/2001	Matthew E. Hansen	1857.0300001/JTH/TAD	9945

26111 7590 03/16/2004

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WASHINGTON, DC 20005

EXAMINER

LEE, HWA S

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 03/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/907,902	HANSEN, MATTHEW E.	
	Examiner	Art Unit	
	Andrew H. Lee	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39, 41, 42 and 44-64 is/are rejected.
- 7) ☒ Claim(s) 40 and 43 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11/7/03</u> | 6) <input type="checkbox"/> Other: _____ |

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Claim Rejections - 35 USC § 103

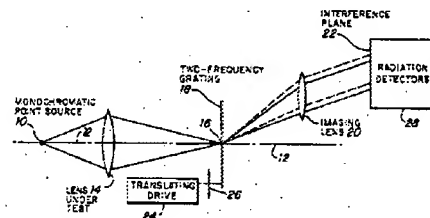
1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 39, 41, 42, 44-47, 54-61, 63, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wyant (US 3,829,219).

Wyant shows a shearing interferometer for producing a shearing interferograms of a wavefront being converged to a focal point comprising:

- 1) placing a holographic reticle (column 2, lines 33+ and column 7, line 3+) in a path of an optical beam within the optical system;
- 2) detecting (28) an image produced by the path of the optical beam passing through the holographic reticle; and
- 3) analyzing the image to characterize the optical system (column 3, lines 19+) for at least one of field curvature, astigmatism, coma, distortion, telecentricity, spherical aberrations, and variation of coherence (column 6, lines 50+ and column 7, lines 28+).



Wyant does not expressly say that the image is "recorded" but shows that the image is detected. At the time of the invention, one of ordinary skill in the art would recognize that the detected images of Wyant are recorded, whether the detectors record the image by recording photoelectric radiation to an electrical signal, or as shown by Wyant in Figures 3-5, photographs

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of the image where the photographic paper converts photoelectric radiation to a chemical change in the photographic paper.

With regards to claims 41 and 42, the holographic gratings have a plurality of feature sets thereon (column 2, lines 36+).

With regards to claims 44, 45 and 61, please see the photographs shown as Figures 3-5.

With regards to claim 46, please see the fringe lines shifted in Figures 3-5.

With regards to claims 47, 58, and 59 Wyant shows that the images are analyzed in real time using detectors (28).

With regards to claims 54 and 63, although Wyant does not expressly show the use of comparing images, it is obvious to one of ordinary skill in the art to compare an image showing minimal aberrations with the image recorded in order to compare the level of aberration.

With regards to claims 55 and 64, Wyant shows the use of light sources having either coherent light or short coherent light (laser, white light) and shows the analysis of the fringe contrasts due to phase shifts (column 5, lines 16+ and 55+).

With regards to claim 56, please see column 3, lines 59+ and column 6, lines 42+.

With regards to claim 57, please see column 2, lines 59+.

3. Claims 48 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wyant as applied to claims 39 and 60 above, and further in view of Abitol et al (US 5,825,476).

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Wyant shows all the limitations and furthermore shows aberration is determined and that there is no limit to the measuring accuracy (column 5, lines 65+), but does not expressly show that Zernike aberration is determined.

Abitol et al show an apparatus for mapping optical elements showing the motivation to determine Zernike aberration.

At the time of the invention, one of ordinary skill in the art would have been motivated to use the teachings of Wyant to determine Zernike aberration in order to obtain a polynomial that expresses (numerical expression) the aberration of the optical system.

4. Claims 49-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wyant as applied to claim 39 above, and further in view of Ellerbroek et al (US 5,128,530).

Wyant shows all the limitations and furthermore shows an interferograms is made and that there is no limit to the measuring accuracy (column 5, lines 65+), but does not expressly show that the interferograms has one or more tilts and pistons.

Ellerbroek et al shows that lens systems can have errors or set to have tilt and piston.

At the time of the invention, one of ordinary skill in the art would have produced an interferogram showing the optical characteristics of the lens or a system of lenses wherein the lens has error of or designed tilt and piston because Ellebroek teaches that lens systems can have of tilt and piston. Further more, Ellerbroek suggests to one of ordinary skill in the art to estimate piston error, and since Wyant says that there is no limit to the measuring accuracy, one of ordinary skill in the art would have been motivated to estimate such errors.

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Allowable Subject Matter

5. Claims 40 and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to show or to suggest a method of using a holographic reticle to characterize an optical system comprising of all the steps as presently claimed wherein the first plane containing the reticle is positioned obliquely to a second plane where the image is recorded.

Papers related to this application may be submitted to Technology Center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the PTO Fax Center located in CP4-4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Center number is 703-872-9306 for regular communications and for After Final communications.

If the Applicant wishes to send a Fax dealing with either a Proposed Amendment or for discussion for a phone interview then the fax should:

a) Contain either the statement "DRAFT" or "PROPOSED AMENDMENT" on the Fax Cover Sheet; and

b) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

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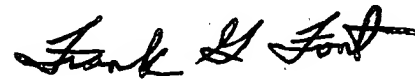
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa Lee whose telephone number is (571) 272-2419.

The examiner can normally be reached on M-Th. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415.



Andrew Lee
Patent Examiner
Art Unit 2877



Frank G. Font
Supervisory Patent Examiner
Technology Center 2800

February 26, 2004/ahl